

DOCKETED

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

THE MAGNAVOX COMPANY,
a Corporation, and
SANDERS ASSOCIATES, INC.,
a Corporation,

: Consolidated Civil
Actions No. 74 C 1030
: No. 74 C 2510

Plaintiffs, : DEPOSITION OF:

-v-

CHICAGO DYNAMIC INDUSTRIES,
INC., a Corporation,

: **FILED** H. TEGER

OCT 29 1976

Defendant. :

H. Stuart Cunningham, Clerk
United States District Court

Transcript in the above-entitled matter
taken before Guy J. Renzi and Edwin Silver, Certified
Shorthand Reporters and Notaries Public of the State of
New Jersey at 824 West State Street, Trenton, New Jersey,
on Wednesday, October 27, 1976. (Afternoon session)

A P P E A R A N C E S

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and Worldwide Distributors, Inc.

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1 2 3 4 5 6 7 8 9 0 A P P E A R A N C E S: (Continued)

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Inc.

E X H I B I T S

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I N D E X

<u>WITNESS</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>
ALFRED H. TEGER	108	207	229

E X H I B I T S

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>I.D.</u>	<u>EVID.</u>
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RCA-8	3-Page Document, "Sections 10 and 11, Number of Hours Charged to SO-10605 [Open House]"	150	
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RCA-9	This number reserved for BBC Film	194	
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...ALFRED H. TEGER, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION
BY MR. GOLDENBERG:

MR. GOLDENBERG: Mr. Teger's deposition is being taken pursuant to a subpoena and there is an agreement between counsel for the parties and Mr. Tripoli representing RCA, the deposition is being taken at this present location rather than at the location specified in the subpoena.

To the extent that it is necessary, I repeat, that from the defendant's point of view, the portion of the subpoena which called for production of documents by Mr. Teger has been satisfied and complied with as a result of the efforts and production made by RCA in this matter.

Q Mr. Teger, would you state your name as you ordinarily use it in business and your residence address?

A Alfred Teger, and the address is 448B Pine Bank Road, Flemington, New Jersey.

Q Mr. Teger, could you tell us your education after high school, naming institutions attended, degrees received, if any, and major courses

1 of study?

2 A I received an AB and BS Degree from Columbia
3 University and attended the University of Pennsylvania,
4 received an MS, I believe, in 1965.

5 Q Your degrees at Columbia, sir, what were
the major subjects or subject?

A Electrical engineering.

Q And your MS Degree from the University
of Pennsylvania?

A Electrical engineering.

Q The degree from Pennsylvania was 1965?

A Right.

Q When did you receive your degree from
Columbia?

A 1961. for the AB and 1962 for the BS.

Q Are you employed, sir?

A Yes, I am.

Q By whom?

A RCA Laboratories, Princeton, New Jersey.

Q How long have you been employed there?

A Fifteen years.

Q Since 1961?

A Since 1962.

Q What is the present title of your position, if there is one?

A Head, Advance System Research.

Q Could you state, generally, what your duties are, sir. And in answering the question, I would ask you not to tell us anything about the development activities of RCA at this time.

A I manage a research group involved in computer system development and applications.

Q Do you have any people reporting to you?

A Yes, I do.

Q How many are there?

A Approximately 20.

Q Could you describe, generally, what those people are? Are they engineers, scientists or technicians?

A They're engineers, scientists, and

a few technicians, in both double E type of background and computer background.

Q Were you employed by RCA during the calendar year 1967?

A Yes, I was.

Q What position did you hold during that year?

A I was a member of the technical staff.

Q And what particular group of the company at that time?

A I don't recall the title of the group, but it was under Mort Lewin, in I believe what was called the computer research laboratory.

Q Was this at the RCA Laboratories, in Princeton?

A Yes.

Q What generally were your duties at that time?

A Research investigation in new computer applications.

Q Could you give us some examples of such applications, to the extent that you believe that they are not proprietary to the company at this time -- and I am talking in this period, 1967?

A I had done some investigation in integrated --

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well, use of computers in designing integrated circuits,
and at that point had spent a little bit of time
in exploring the uses of computer graphics.

Q Could you explain what you mean by computer graphics?

A The use of a display in conjunction with a computer for the purposes of improving the interaction between a human and a computer.

Q What kind of display, sir?

A What kind of a display did I use or in general?

Q Were you investigating at that time.

A I'm not quite sure what you mean by the question.

Q What kind of device would be used as a display device?

MR. ANDERSON: Or devices.

Q Or devices which you were investigating at that time.

A In the initial phases of the work we were exploring the use of refresh tubes and storage tubes for their ease of being used with a computer in terms of the cost involved.

Q All right, sir. What kind of tubes are these?

A They are cathode ray tubes.

Q Could you explain what a refresh cathode ray tube is?

A That's a tube where the display is produced

by a phosphor with a short life; such that it must be refreshed on the order or rewritten to the screen of the tube on the order of 30 times per second in order to be visible to the eye; whereas storage tubes displays are written once to the screen, it is held on the screen surface until rewritten.

Q Were such devices commercially available in 1967?

A Yes.

Q If you recall, can you name any manufacturers of such devices in 1967?

A All right. Information Display Incorporated; Adage Corporation; Sanders Associates; Data Disc. I believe a company called the Conographics. There were many others.

Q These are the ones that occur to you right now?

A Right.

Q With respect to each one of the companies you named, and I will read them off to you, can you tell me whether they made a cathode ray tube of the refresh type or the storage type?

A Okay.

Q And IDI was the first one you named.

A IDI made the refresh type.

Q How about Adage Corp.?

A I know they had a refresh type display and I think they may have had a storage display as well.

Q Sanders Associates?

A Refresh.

Q Data Disc?

A I believe that Data Disc had really a refresh type, but I think it was raster scan type of display, which is different from what I described--well, which is a subcategory of a refresh type display.

Q How about Conographics?

A Refresh and, I think, that may have been raster scan also.

Q Do you have any recollection as to whether or not the refresh types sold by IDI, Adage and Sanders were of the raster scan type.

A No, I don't believe they were.

Q Could you provide an explanation of what you mean by raster scan?

A Right. Raster scan would be a type of refresh tube where the screen is scanned sequentially one line at a time in approximately the same manner that a TV picture is generated on the screen.

Q Now, was there any difference in capability between a cathode-ray tube of the storage type and that of the refresh type?

MR. ANDERSON: I object to the question as vague and ambiguous. It is also irrelevant to any issue that I know of in this litigation. It is apparently relying on this witness's expertise for some reason without any establishment of time except in the most general sense or irrelevance of what some other company was doing about this time.

MR. GOLDENBERG: Mr. Anderson, I have your objection, and in the interest of time, I would ask the witness to answer the question.

MR. ANDERSON: Well, I object. There is no

testimony that this witness had this, anyone of these five in his possession at RCA, or was working with it actively at anytime either in 1967 or earlier than that or later than that, and it is totally irrelevant unless you lay some foundation.

MR. GOLDENBERG: I understand that you object and I'm asking for the answer subject to your objection.

MR. TRIPOLI: You may answer the question.

THE WITNESS: Could I have the question repeated?

(The pending question reread by the reporter.)

MR. ANDERSON: I object again. You mean just the tube itself or something connected with the tube?

There is no testimony even that the tube itself was different.

MR. GOLDENBERG: I thought there was.

Q Are the tubes the same, sir?

A They are not the same.

Q I thought that's what your testimony was.

With that understanding, could you answer the question and, of course, the reporter can read

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it back to you if you have forgotten it as a result of that little exchange.

A The storage tube display, by virtue of the fact that it does not have to be rewritten very rapidly can tend to hold more information on the display without a phenomenon known as blinking, where -- well, it can hold more information on the screen.

The refresh type tube has, I think I better answer that with respect to each of the types of refresh tubes.

A raster scan type refresh tube has no limitation either in terms of the amount of information on the screen. The other type of refresh tube is one where each line on the screen is written from one point to another point directly by the electron beam as opposed to scanning the whole screen one line at a time.

That point to point type of refresh tube does have a limitation on the amount of information that can be held without a blinking effect, which is due to the length of time to write a given, a single frame.

At that time our experience was that for high interaction between the man and the display, that a refresh tube was desirable over a storage type

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tube.

Q Mr. Teger, do you understand we are talking about 1967, in that period?

A Right.

Q What is the basis of your knowledge that the five companies that you named were offering this type of equipment?

MR. ANDERSON: I object. The testimony I think was tube. Now, was it tube or equipment? Your question is in terms different than the prior testimony.

Q This kind of tube, sir.

MR. ANDERSON: Not equipment.

MR. GOLDENBERG: I have changed the question.

A The companies I listed are only companies that I recollect as ones that we considered at the time. I am not at all sure that those, indeed, were the ones that we considered purchasing from, and I am not at all sure that they were even in fact in business at that time.

Q Now, sir, when you say they offered tubes of these two different types, is that all they offered, or did they offer anything else in conjunction with the tube?

MR. ANDERSON: I object. The witness

has just testified he is not even sure that these companies were in business at that time.

And I think it's improper.

MR. GOLDENBERG: I understand that, and I think the record makes that clear. I will not contend otherwise, I assure you, Mr. Anderson.

Q Putting aside for the moment the matter of time--

MR. ANDERSON: I object. You cannot put an aside the question of time in a lawsuit of this kind. Time is of fundamental importance. If the witness doesn't know when, his testimony is totally irrelevant about things that he did or didn't do or things that he did or didn't know, because they're all totally relevant. I violently object to that line of testimony.

The purpose of this deposition is to learn facts of this witness's experience. I think it has no other purpose.

MR. GOLDENBERG: Mr. Anderson, I am entitled to ask questions as I will. If I want to, in the course of my present questioning, put aside the element of time,

I think I am entitled to do that. If you believe there is something you want to bring out with respect to time, that is indeed your right.

MR. ANDERSON: I want to record my objection, and I will move that the testimony be stricken at the appropriate time, to exclude it. I think it's an improper line of questioning.

BY MR. GOLDENBERG:

Q Mr. Teger, I would like to repeat the question.

Putting aside this question of timing, where you said you were not clear when you said the devices or tubes were available, my question is that when you refer to products offered by these companies, were you referring to cathode ray tubes of either type, per se, or were you referring to something offered by those companies in association with such tubes?

A I was referring to complete display systems that incorporated a computer in them as well as the tubes offered by those companies as products.

Q All right, sir. Now I would ask you, what is your best recollection with respect to the availability of the IDI equipment in the calendar year 1967?

A That, indeed, was available. IDI was at that time beginning production -- no, I take that -- I'd like to retract that. IDI was, indeed, producing a computer control display system at that time.

Q How about Adage Corporation?

A They were.

Q Sanders Associates?

A I'm almost certain that they were also producing it.

Q How about Data Disc?

A I believe they were producing them, also.

Q Conographics?

A The same. My recollection, indeed, was that this was a group of companies that we had considered at that time.

Q Did you, in conjunction with anybody else on behalf of RCA, buy any of this equipment in 1967?

A In either 1966 or '67 we did, indeed, purchase a display system from Information Displays, Incorporated.

Q At the time you made that purchase on behalf of RCA, did you investigate the market to see what was available?

A Yes.

Q Does your knowledge of what was available at that time come as a result of that investigation at that time?

MR. ANDERSON: I object. You're leading the witness.

MR. GOLDENBERG: I withdraw the question.

Q How did you come by your knowledge of what equipment, cathode tube displays, was available in this period in 1967 and possibly 1966?

A Through investigating the literature, attending computer conventions, and through contacts at other companies, professional contacts.

Q I believe it is your testimony that these various kinds of cathode ray tubes had associated with them I think you called them computer. What was the purpose of that computer in those devices? And if you have to distinguish between various devices in your answer, please do so.

MR. ANDERSON: I object for lack of foundation. There has been no evidence that this witness had any possession or access to

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any, except perhaps, at best, the IDI equipment.

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BY MR. GOLDENBERG:

Q Could you answer the question, sir?

A Sorry. Could you repeat the question.

[The Reporter reads the pending question.]

A The computer stored the information that was eventually put on the display--the computer would control through a program the manner in which a human being would interact with the computer and the program. The computer would receive signals from whatever input device was being used to indicate what the human was attempting to point at on the screen, and through the software program modify the display, will produce some difference in the output. Now, the manner in which the display shown, and the computer's role in that, did vary in the different types of systems.

Q What kinds of things could be displayed?

And let's confine this, say, to the IDI device.

MR. ANDERSON: I'm sorry. Would you read the question, please.

[The Reporter reads the pending question.]

A The IDI system was capable of displaying lines, points, circles, and characters, with options for varying such things as line thickness and line structure, character size, and intensity.

Q Could the location of any of those things capable of being displayed be on the screen of the tube, be controlled by an operator, or determined by an operator in some way?

A Yes, it could, in conjunction with a software program for interpreting actions of the human.

Q Could, for instance, a circle be displayed at the top center of the screen or the bottom center of the screen, depending on the desire of the person operating the device?

MR. ANDERSON: I object. You're leading the witness.

MR. GOLDENBERG: I don't think I am, sir, I really don't. He has--

MR. ANDERSON: All he has to say is yes or no to that rather detailed explanation of how you think something worked.

MR. GOLDENBERG: I don't know how it worked.

MR. ANDERSON: I know. But you're certainly leading us to believe that you have an idea. You're leading the witness, and I object to that procedure.

MR. GOLDENBERG: I don't think I am. The witness has testified that the operator

could control the locations of these various things capable of being displayed. I'm simply trying to elicit a specific thing.

I'm willing, again, to save time. Let's strike the question.

Q I would ask you, sir, can you give us an example of how an operator could control the location on the screen of the tube of something that he wanted to display?

A Yes. A computer program could be established that would include a display instruction for positioning an item such as a line or a circle at a given X, Y location on the screen.

Now, in the case of the IDI system, we had an external device called a light pen which was attached to the display on the computer. The light pen was capable of detecting light when pointed at the surface of the display screen. And upon the detection of light, could indicate to the computer the particular word or instruction being executed. And in so doing, could identify to the computer which line or circle was being pointed at.

Based on that information, the program could take an action upon knowing that the operator was pointing at a particular item and one possible action would be to display the object in either X or Y locations by a given amount, and that displacement could continue over some period of time.

Q To the extent that you know, sir, in this period, 1966/1967, what were the uses or applications

of these display devices that you have been describing?

MR. ANDERSON: I object and I think it is asking the witness to speculate and delve in hearsay. I think if you want to know what he did, that's a proper question. Anything else is hearsay.

Q Do you understand my question, sir, as to the extent of your knowledge?

MR. ANDERSON: Personal knowledge?

Q Could you answer it on that basis?

A Could I have the full question read back?

(The pending question was reread by the reporter.)

THE WITNESS: There is a large body of work involved in simply exploring what capabilities such systems had between human -- between the human and the computer. But there were particular systems being built that used the display in the computer for modifying, modifying images for use in designing circuits, circuit schematics and art work for integrated circuits.

In addition, there were a number of companies that had game type of applications demonstrated on their equipment.

Q First, with respect to the application to electrical or electronic circuit matters, how do you know that this period 1967, what is the basis of your knowledge?

A Through the literature at that time I was acquainted with some systems which were using graphics directly at that point. One of them was United Aircraft.

Q This is reading the technical literature, do I understand?

A Yes.

Q Is there any other basis that you would have for that knowledge as a result of your own experience in the period 1966 - 1967?

A This is in the area of--

Q Circuit applications.

A --circuit applications?

That was the predominant means that I was acquainted with the application.

Q All right, sir. How about this matter of playing games? What is the basis of your knowledge there, sir?

MR. ANDERSON: Based on the witness's prior testimony, I will object in advance to testimony about what he read or heard from other

people on the grounds that that is hearsay.

MR. GOLDENBERG: The basis of his knowledge is not hearsay. It may be that his testimony on the basis of this answer will not have much probative value.

MR. ANDERSON: I object to any testimony about what other people did.

The best evidence of that is the other people's testimony or the actual documents that the witness made, things he remembers seeing about 1967, or whatever date.

MR. GOLDENBERG: Remember, the witness is being asked to use the basis of his knowledge. That is not hearsay.

Q Have you lost track of the question, sir?

A No.

Q Could you answer it?

A Yes. My knowledge on the game side of things was through direct viewing of at least one of these applications, I believe, at some of the computer conferences at that time. In particular there was, indeed, a pool-type game application that I remember seeing at a national computer conference in the time frame of '66 - '67. And I believe that the

equipment that was on display was Digital Equipment Corporation, a small computer display.

Q Do you recall where that conference was, sir?

A No, I don't.

Q Do you recall the name of the sponsoring organization, if there was such?

A Yes. It should be AFIPS. And it was called the National Computer Conference. Actually, spring or fall joint computer conference.

Q What does AFIPS stand for?

A I believe American Federation of Information Processing Societies.

Q And that was in the spring?

A That was also sponsored, I believe, by the IEEE; Institute of Electrical and Electronic Engineers.

Q And this was a spring or fall computer conference?

A Yeah, called joint computer conference.

Q Spring or fall of '66 or '67?

A It would have been spring or fall of '66 or spring of '67.

Q Do you customarily attend that conference?

A I have attended many of them.

Q Where are they customarily held or is there no customary location for them?

A It does vary, but they were often, especially at that time, in San Francisco on the West Coast and New York on the East Coast. Generally spring -- well, I will retract that.

Q I was going to ask you, sir, I gather you do not know the answer as to whether the spring was in San Francisco or fall, or what?

A I am not sure.

Q And I would ask you that we are trying to get your best recollection, if you feel that you are having to guess or speculate, don't do that.

A Yes, I don't recall.

Q But do I understand you to say that if it were a spring conference, it would have been at the latest in the spring of '67?

A Correct.

Q To the extent that you recall, could you describe that game as you saw it?

MR. ANDERSON: Again I object on the ground that this is clearly not the best evidence. It lacks a sufficient foundation, it is unfixed in time; within a year and a half.

MR. GOLDENBERG: All that goes to weight, sir. It does not go to admissibility.

THE WITNESS: Should I answer?

Q Yes, sir, if you would.

A The reason I do recollect that particular game was that that was where the idea for the one that we eventually built had to come from. And to the best of my recollection, that also was a refresh type tube with a light pen attachment and, in fact, they did display the outline of a pool table and the balls on the pool table and the soft control, the light pen could be used to create the effect of hitting the cue ball with a stick.

Q When the apparent cue ball was contacted in some way by this light pen, what happened to the cue ball?

A The cue ball would move in a direction as though it had been hit with a stick on that side of the ball and

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would move across the table until it hit another ball or the wall or it came to a stop because of the effect of friction that was supposed to be on the table.

Q If the cue ball hit another ball, what would happen?

A The other ball would -- the balls would collide and rebound, simulating the way they would on a physical pool table.

Q Suppose anyone with the balls hit the side of the table, what would happen?

A It would rebound from the side of the table. Again, visually they would in the same type way as they would from a pool table.

Q How many balls are displayed?

A The full set of 15 balls plus cue ball.

Q Were pockets displayed?

A Yes.

Q What happened when a ball entered a pocket?

MR. ANDERSON: I object to the testimony, I mean the questions, excuse me. There is no foundation that we determined entry.

Q You are quite right, Mr. Anderson.

Could balls enter the pockets at any time during the play of the game?

A Yes. If a ball came into the area on the display screen where a pocket was shown, instead of-- well, the computer program would interpret the ball's position in or very close to a pocket in such a way as to decide whether the ball would have entered a real pocket, and if the program decided it could have, it would remove it from the screen, that is, blank it from the surface of the screen. And, in

fact, that is how you score for the players.

Q Do you recall how the score was tallied?

A No, I don't, for the computer conference.

Q I believe it is your testimony that you saw this game at this conference before some pool game activity that you undertook, is that correct?

A That's correct.

Q When did you undertake the pool game activity on your own part?

A The early summer of 1967.

Q What was the reason for you undertaking that activity?

A To create a demonstration of a computer display system that could be used as part of a large open house demonstration that RCA Laboratories was about to give that fall.

Q Did anyone instruct you to undertake that activity, sir?

A Yes. My supervisor who at that time was Mort Lewin did, offered the suggestion that we could, in fact, develop a demonstration program such as pool for that open house celebration.

Q Do you recall who made that suggestion?

A The suggestion for doing the pool program?

Q Yes, sir.

A I believe it was at the suggestion of either myself or Larry French.

At some convenient point I'd like to discuss something with my counsel.

MR. GOLDENBERG: Now is as good a time as any.

(Off the record.)

BY MR. GOLDENBERG:

Q Mr. Teger, what was the occasion, or what was the nature of the event when this suggestion was made with respect to a pool game?

A The open house event was actually in celebration of the 25th anniversary of RCA Laboratories.

Q Perhaps, sir, my question is not clear.

Was there a meeting, or what, in which you or Mr. French made this suggestion?

A Suggestions were solicited from the staff for what type of demonstrations would be appropriate for the public for this anniversary. And as such, one or two of us suggested the pool game application.

Q Why did you suggest the pool game?

A Because I felt that it was a good illustration of what, as we were calling it then, the computer graphics was all about, namely that the human being has an ability to grasp certain visual images better than text descriptions. And in this case that image was to be a pool room table and balls and their motion; and that we could demonstrate that the human being could interact with the computer through a display, and in this case by

using a light pen without having to know anything about the computer or the program that was at that time running within the computer.

Q Sir, I'd like to go back to another topic. We will return to this in a moment.

I believe it is your testimony that the light pen is a part of the IDI apparatus, that you're familiar with. Now, with respect to the apparatus made by the Adage Corporation, what was the form of the human input to that piece of apparatus, if you recall?

MR. ANDERSON: I object on the grounds that it's irrelevant and requests for hearsay.

MR. GOLDENBERG: I don't believe it is, sir.

MR. ANDERSON: You have not established that this witness ever had in his possession an Adage or analyzed it in any way. And other than that, it's hearsay as to this witness.

MR. GOLDENBERG: Mr. Anderson, I believe the witness has testified that he investigated these products before making a purchase on behalf of RCA, and he has gained some familiarity with that as a result of that investigation.

BY MR. GOLDENBERG:

Q Again, you understand this is confined to this 1967 - '67 period --

MR. ANDERSON: You mean '66 - '67.

MR. GOLDENBERG: I'm sorry. '66 - '67. period. - I misspoke.

BY MR. GOLDENBERG:

Q If you recall, how did the human interact with that apparatus made by the Adage Corporation?

MR. ANDERSON: I object. I don't think

there is any testimony to date that this witness has any knowledge that the Adage equipment was used with human interaction.

BY MR. GOLDENBERG:

Q Was there human interaction, sir, with the Adage apparatus, to the extent that you recall?

A There was human interaction inherent in all of the systems that we explored at that time, because in fact that was the point of the research that we were beginning in that period.

Q Could you describe, with the qualifications that I gave you, your recollection during this time period, of how the human interacted with the Adage Corporation equipment?

A As I recall, the Adage display system had both the light pen and the tablet-type of input device.

Q Would you explain what the tablet-type of input device is?

A A tablet-type of input device is one held a pen-like instrument against the writing surface, and the computer system could interpret from that what XY location was being indicated on the writing surface.

Q What was the writing surface?

A They were generally some--

MR. ANDERSON: I object to "They were generally."

Are you asking him about some general mystical concept at that time, or are you interrogating him about the Adage equipment?

MR. GOLDENBERG: I'm asking the witness a question which I think is clear. I think he is entitled to answer it in his own way, sir. If you are not satisfied with the answer, you are entitled to cross-examine on the matter.

MR. ANDERSON: Well, the Judge is not here, of course. And I am not sure the witness has enough knowledge of legal procedure to recognize that he is to answer the question. And if he knows the answer to a question, fine. But he is not to generalize. The purpose of this is not to get a general observation of what may have existed in the field.

MR. GOLDENBERG: I don't think that's a fair statement with respect to the witness in order for him to conduct himself. What we are seeking is his knowledge. If his knowledge is of a general thing, he will so state, as he did. And if either one of us

is dissatisfied with that answer, we are entitled to ask more questions about it.

MR. ANDERSON: Well, his knowledge of a general thing is totally irrelevant to any issue in this lawsuit, and I think to pursue this line is prolonging the deposition unreasonably.

If you're going to rely on this for any purpose, it's clearly not the best evidence. It's not evidence at all of what Adage may have done, it's not probative in this court, and I think you should forego it, get to the facts that this witness has of his own knowledge, of his own experience.

The motion that was granted to take this discovery was limited to discovery-- or testimony with respect to the RCA pool game.

MR. GOLDENBERG: No, sir, it was not. I believe the precise words of Judge Grady were RCA activities. Activities and knowledge of its employees falls well within the purview of that statement.

MR. ANDERSON: You have switched already from activities to knowledge of one employee.

I imagine there were several thousand employees at the lab.

MR. GOLDENBERG: I think we are beginning to repeat ourselves.

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BY MR. GOLDENBERG:

Q Mr. Teger, could you answer the question.

Would you like the reporter to read it back?

A No.

I don't recall the exact details of the physical description of the Adage tablet, and I could only answer that in terms of what typical tablets at that time were like.

Q Could you do that, sir?

A The tablets were, in general, a flat surface covered with either glass or a plastic. And one would move a pen type of instrument across it. A drawing or sheet of paper could be placed on top of it at the same time.

Q Was there any other way for the human to interact with the Adage device, that you recall?

A Not that I recall.

Q Was it possible for a human -- and you understand this is 1966-67 -- to interact with the Sanders Associate device?

A I'm fairly sure that Sanders had also a light pen type of interaction. I don't recall any other mechanisms.

Q How about Data Disc?

A The others on the list that I gave you, I'm really not sure of what type of input devices they used. There were other types of devices used in the research environment, such as MIT, which did some of the original display work.

Q How do you have knowledge of the MIT display work?

A Through papers and conferences and publications.

(Off the record.)

BY MR. GOLDENBERG:

Q All right, sir. I'd like to return to this occasion when the pool game for the RCA open house was suggested and discussed. Could you tell me again as to when you think that first occurred?

A I'm sorry. The decision to use it?

Q Yes, sir.

A I believe in June of '67.

Q Was this at a meeting?

A I had made the suggestion to my superior, and then a committee had met to decide which of the suggestions would actually be used for demonstration purposes.

Q Did you attend that committee meeting?

A No.

Q Were its results reported back to you?

A Yes.

Q Do you recall what the report was?

A The report was that if we could develop a demonstration of the pool table game that that would be suitable for the celebration.

Q Were any kind of restraints put on you at the time you were told to go ahead?

A None, other than to -- other than with a reasonable amount of effort to develop whatever demonstration could be done before the date of the open house.

Q What did you understand by the word "reasonable"?

A It meant not to sacrifice the other technical programs in progress at that time.

Q Were any kind of financial restraints put on you?

A Not that I recall.

Q Any kind of time restraints?

A Well, indeed, at that time we had on the order of three months until the open house, and that was the primary time constraint, as well as continuing some of the other efforts.

Q Do you recall how much time you spent on

developing this pool game display during that three month period?

A Me personally, or the total people working on the game?

Q You personally, sir, is the question right now.

A I don't recall exactly, but I would estimate about a month and a half of effort, perhaps a little bit more, perhaps closer to two months.

Q Therefore, your part might be 60 man days, or figuring how ever you want?

A Roughly.

Q How about the time of any others who were involved with you?

A I'd say there was about an equivalent amount of effort on the part of two other people.

Q Could you identify those two other people, sir?

A Yes. One is Larry French, still of RCA; and the other is Frank Larkin, who is no longer with RCA.

Q Did they work in the same group in which you worked at that time?

A Yes.

Q Was Mr. French still working in the same

group?

A No. He is working in a group at RCA, Somerville, New Jersey.

(Off the record.)

THE WITNESS: I have not really looked at that list carefully.

BY MR. GOLDENBERG:

Q Did you have to keep a record of your time spent on this pool game display project?

A Yes. The charges for the open house demonstrations were being charged to separate shop order numbers in order to keep track of the effort involved.

(Off the record.)

Q Mr. Teger, would it be a correct understanding that there was some job order or something like that which was set up and charges in connection with this demonstration and preparation would be charged against that number?

A That's correct.

Q Do you know how those charges were recorded?

And by that I mean was some card filled out at the end of the week, or something like that?

A Yes. There are time cards filled out at the end of each week.

Q Do you know where those time cards are now?

A No.

Q Have you ever seen a listing of the amount of time charged against this demonstration preparation?

A Yes, briefly.

Q Where have you seen such a listing?

A In the possession of Bernard Lechner of RCA Laboratories.

Q Who is he, sir?

A He is currently a group head in the systems research laboratory.

Q Have you ever worked with or for Mr. Lechner?

A Yes, both.

Q When did you work for him?

A It was after the 1967 time period. I don't recall exactly. I believe '68 or '69.

Q All right, sir. What was the occasion on which you saw this list of charges against this, or in connection with this demonstration preparation of the pool game?

A Specifically, I saw it recently in looking for material relevant to the open house.

Q Had you ever seen this before that, sir?

A No, I haven't. I knew that it was being kept.

MR. GOLDENBERG: I would like the Reporter to mark this three-page document entitled "Sections 10 and 11, Number of Hours Charged to SO-10605(Open House)" as RCA deposition Exhibit 8.

[Exhibit No. 8 - document entitled "Sections 10 and 11, Number of Hours Charged to SO-10605 (Open House) marked for identification.]

Q Mr. Teger, I show you deposition Exhibit 8 and I ask you if you have ever seen it

before?

A Yes, I have.

Q Is this the list of charges about which you testified just a few moments ago?

A Yes, it is.

Q Sir, directing your attention to the first page at the top of the page in reference to the week of August 7th, 1967; is that when you began to work on this demonstration project?

MR. ANDERSON: I object. I think his testimony was earlier that they started in June.

MR. GOLDENBERG: I believe that's correct and, perhaps, my question is rather inartfully put.

Q I believe it is your testimony that you did start in June?

A Yes.

Q Is that still your testimony after looking at this document, Exhibit 8?

MR. ANDERSON: I object. I think you are leading the witness.

MR. GOLDENBERG: No, sir, I am not.

THE WITNESS: The answer is yes.

MR. ANDERSON: He hasn't seen the document before.

MR. GOLDENBERG: The answer is yes, as I thought it would be, sir.

Q Is there any other lists recording charges against this open house for Sections 10 and 11 that

you are familiar with?

A Not that I am familiar with.

Q All right, sir.

Directing your attention once again to the entries under the week of August 7, I don't see your name.

Would it be a correct understanding that you did not record any charges during that week?

MR. ANDERSON: I object, you are leading the witness.

MR. GOLDENBERG: I am trying to avoid it.

MR. ANDERSON: You are not trying very hard, Mr. Goldenberg. I can do better and I think you can.

MR. GOLDENBERG: Oh, I don't know.

Q What is the significance of the fact that under the entries, under the week of August 7th your name does not appear, sir?

A Some of the early work was considered exploratory and was not charged to this particular number, and some of the early work was done off hours in the evenings and weekends.

Q Were you paid for that time?

A Staff members are not normally paid overtime.

The answer is no in this case.

Q All right, sir.

Well, still directing your attention to the entries of the week of August 7, I see Mr. Lechner's name there. Did he work on the pool demonstration project?

A No.

Q How about Mr. G. W. Taylor?

A No.

Q Mr. Orvat?

A No. This represents people working on any of the demonstrations.

Q So the times we see recorded here can be in connection with some other demonstration?

A Correct.

Q Were there other demonstrations put on by Sections 10 and 11?

A Yes, many.

Q All right, sir.

Well, directing your attention to the entries under the week of August 14th, is that your name, A. Teger?

A Yes, it is.

Q Do you have any recollection whether the entry of time beside your name is correct or

incorrect?

MR. ANDERSON: I object. There is no testimony that the witness prepared the document. In fact, I think he said he never saw it before.

Are you asking him now independently of this how much time he spent on this project during the week of August 14th, 1967?

MR. GOLDENBERG: Well, my question, I think speaks for itself. But in a certain sense, that is what I am doing.

THE WITNESS: I don't recall how much time I devoted that week.

Q So you don't know whether the entry there beside your name of four and three-quarter hours is a correct entry or not?

A That's correct.

Q Is that Mr. Winder or Winder?

A Winder.

Q Did he work on the pool demonstration project?

A No.

Q Lechner?

A No.

Q Taylor?

A No.

Q Burton?

A No.

Q Perhaps we could shorten this up, if you could go through the remainder of entries on this Exhibit 8 for each week and tell us who was working on the pool demonstration project. Just take each week up in order as it appears there.

The next one would be the week of August 21st.

A Yes. Just A. Teger.

The week of the 28th, A. Teger.

The week of September 4th, A. Teger.

I'm sorry that I am hesitating here because there is another name on here who was aiding in preparing the demonstration but did not actually participate in the development of the computer, of the technical side of the computer program with the demonstration.

There was administrative assistance from C. Harris. And I don't know whether you would like that included. That was not technical support, but it was administrative support.

Q Could you elaborate on what you mean by administrative support?

A Yes. Preparing charts. There were a few charts at the time used to describe what the system was doing. Preparing the room, making arrangements for visitors.

Q Was Mr. Harris doing this only in connection with the pool demonstration, or was he making this effort in connection with other demonstrations as well?

A I don't recall. He was indeed a technician for me and Larry French at that time.

Q Well, would it be correct, as you continue through this, that this same question with respect to accounting for Mr. Harris' time would be in your mind?

A Yes.

So should we continue and omit him?

Q Could you with that understanding, sir?

A I believe I'm up to September 4th.

Q Yes, sir.

A A. Teger.

September 11th--

MR. ANDERSON: Well, and Harris again in each case?

THE WITNESS: Harris will continue, yes.

MR. ANDERSON: In each case when Harris' name appears, he will be involved to the extent which you have already testified?

THE WITNESS: Correct.

The week of September 11th, A. Teger.

The week of September 18th, A. Teger.

The week of September--

MR. ANDERSON: And Harris again there?

THE WITNESS: Yes.

Week of September 25th, L. J. French;

F. P. Larkin; H. F. Schneitzer; A. Teger; and

the question of C. Harris.

Q Do you have any explanation as to why there is an increased amount of--apparent increased amount of man-hours for the week of September 25th?

A Indeed, it was panic over attempting to complete all the demonstrations in time.

MR. GOLDENBERG: Mr. Tripoli, is it a correct understanding that this document, a copy of which we marked as Exhibit 8, came from the files of RCA?

MR. TRIPOLI: That is correct, and to be specific, it came from this folder which is green in color, approximately 8-1/2 by 11 marked "25th Anniversary Open House," and it was provided to us by Mr. Bernie Lechner.

MR. GOLDENBERG: Do you have any information as to whether it is a file that Mr. Lechner kept in the normal course of his duties or business at RCA?

MR. TRIPOLI: I have no idea.

MR. ANDERSON: I object. We have Mr. Lechner, as I understand it.

MR. GOLDENBERG: I thought Mr. Tripoli might know, that's all.

MR. ANDERSON: I don't think it matters

whether it was or not, as a matter of fact.

Q With respect to Exhibit 8 where it says the week of, whatever the date is, what is your understanding of what that means?

A It should represent the number of hours spent during that week for this purpose, namely, the open house.

Q In accordance with your present recollection, sir, do you believe the times recorded next to your name to be accurate recordations of the time you spent?

MR. ANDERSON: I object. The question has been asked, answered and objected to, I think. The witness has testified he never saw it before and you have asked him that question before.

MR. GOLDENBERG: I don't believe I have.

THE WITNESS: In terms of the accuracy of the hours?

Q According to your present recollection, sir, do you believe this to be an accurate recordation of the amount of time that you spent during the period that is recorded in Exhibit 8?

A No, I don't believe it to be.

Q In what respect is it inaccurate, sir?

A It is less time than was actually spent developing the program.

Q I understand that. But because I believe it is your testimony that you actually started earlier?

A Correct.

MR. ANDERSON: The answer the witness just gave is during this period of time also. He also testified there were other people that aren't listed on here that worked on the project. I think you are misconstruing the record.

THE WITNESS: They were listed only the last week.

MR. GOLDENBERG: That's why I am pursuing the matter, sir. Have in mind that my question to you was concerned with the time that is recorded on this document, putting aside the fact that you actually started earlier, is it, according to your recollection, an accurate recordation of the amount of time that you spent?

THE WITNESS: No, it is not.

MR. ANDERSON: Again I object.

Q All right, sir. Tell me why it is not?

A It does not take into account time out of hours spent on the development of the program.

Q Was there a substantial amount of time taken out of hours?

A Yes.

Q Twice as much as the time we see recorded here; four times as much? What?

A I haven't added up these figures but as I said before, I would estimate that I spent the sum total on the order of 60 man-days.

Q And that starting with this period in June?

A Roughly June.

Q Roughly June. Now, with respect to the time recorded here, starting August 7th, are there any people who worked on the project starting on August 7th whose time is not recorded here that you can recall?

A I'm sorry, could you repeat that?

Q I believe it is your testimony that you and Mr. French, and I think you mentioned a third person--

A Mr. Larkin.

Q Mr. Larkin. Is there any time recorded on here for Mr. Larkin?

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A Only the last week.

Q Did Mr. Larkin spend time subsequent to August 7, 1967 and prior to September 25, 1967 that is not recorded here, if you know?

A Yes, I'm quite sure he did.

Q Do you have any idea how much time he spent in that period?

A At least the equivalent of one man month of effort, and perhaps as much as two man months of effort.

Q Do you have any explanation that you know of as to why his time is not recorded on Exhibit 8?

MR. ANDERSON: I object. The witness testified he didn't see the document before. If he didn't see it, he certainly could not explain why the writer did not include all the time he spent on the project.

MR. GOLDENBERG: I thought my question was clear.

A I do not know why more time is not recorded.

Q The purpose of the pool game demonstrations, if I understood you, is in connection with an open house celebration at RCA Laboratories, in Princeton?

A That's correct.

Q What was the occasion of that open house, if you know?

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A It was a 25th anniversary celebration of the RCA Laboratories in Princeton.

Q Was the open house actually held?

A Yes, it was.

Q How do you know that?

A I participated in demonstrating the pool game on this system during the open house itself.

Q Do you recall when the open house was?

A I am not sure of the exact dates. I believe it was September 27 through 29, of 1967.

Q Who came to the open house, if you know?

A I don't know the exact details of who was invited. Members of the staff were given tickets, and they could distribute the tickets to their friends or relatives to attend. In general, it was a non-technical -- well, I retract that. These tickets could be given out to anyone inside or outside of the company.

Q Did you get any such tickets?

A Yes, I did.

Q What did you do with the tickets you got?

A I invited my family and my wife's family to attend.

Q Did they attend?

A Yes, they did.

Q Do you have any knowledge of how many people attended?

A No, except that it was in the order of thousands.

Q During the actual open house, what was your participation and involvement with it?

A I demonstrated the operation of this computer graphics system and pool game on the system.

Q Do you recall how many days you were involved in such demonstrations?

A It was all day during the weekend of the open house, Saturday and Sunday; and I believe some demonstrations late the week preceding that, but I don't recall which days or how long that was.

Q The demonstrations preceding the Saturday and Sunday, who came to those demonstrations, if you recall?

A I believe specific invited guests, but I don't know what the basis was they were invited on.

Q Do you recall approximately how many such persons came as invited guests?

A Preceding the open house?

Q Yes, sir.

A No, I don't.

Q Do you recall the names of any specific

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individuals who came as invited guests?

A No, I don't.

Q How would you conduct a typical demonstration that you gave--how did you conduct a typical demonstration that you gave either during the period when there were invited guests or the weekend open house? And if they were different, so state.

A No, they were approximately the same, except perhaps from questions from the audience.

I would describe the equipment, the computer and the display and the light pen; and then the fact that the computer program had been written to simulate a pool game on the display surface, and invite two members of the audience to have seats in front of the display terminal and demonstrate to them how to hold and use the light pen and how to point the light pen at the cue ball in order to initiate motion of the cue ball, and the object of the game as the two players would take turns playing.

Q Did you answer questions from the audience that you had at any demonstration?

A Yes, I did.

Q Did any of those questions call for any greater explanation of the apparatus than you had provided in your opening statement?

MR. ANDERSON: I object. You're leading

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the witness.

MR. GOLDENBERG: I don't think I'm leading the witness.

THE WITNESS: I'm sorry, would you repeat the question.

[The Reporter reads the pending question.]

A Yes, certainly.

Q Did you answer such questions?

A Yes.

Q Do you recall any such questions?

A Yes, I do. They were questions that were more technically oriented about how the computer program operated and how the manipulation of the balls on the screen took place inside the computer and the display.

Q Did you answer that kind of question when you received it, sir?

A Yes, I did.

Q Did you hold any information back?

MR. ANDERSON: Well, I object to the question as ambiguous.

A Well, technically--

Q If you understand my question, sir, could you answer it?

A Yes, I do understand it.

No, I did not hold any information back.
We did not consider that the approach--I retract that. I did not hold anything back.

Q What was your reason for not holding any information back?

A We didn't consider any of the approaches used in the pool game particularly proprietary or confidential to RCA at that time.

Q With respect to that kind of question that you received from a member of your audience which went into greater technical detail, were you able to form any conclusion about the technical sophistication of the questioner?

MR. ANDERSON: I object to the question.
It's asking for pure speculation, the best hearsay. I don't know how the answer could possibly--

MR. GOLDENBERG: I think we are entitled to inquire as to factual matters and any conclusions the witness may have had in understanding. He may be completely wrong, and we don't know that.

MR. ANDERSON: That's right, and I have no way of cross-examination. I object.

If you want to ask him about a specific

question and a specific answer, even that's hearsay, but it may have some probative value, and I will permit an answer. But I certainly don't think you are entitled to get any generalization about the technical competence of people like he says--

MR. GOLDENBERG: I haven't asked for any generalizations, sir. My sole question to him was, did he form any conclusions with respect to this matter. If he says no, that's the end of the matter, isn't it?

MR. ANDERSON: It should be the end of the matter without asking the question. I object to it.

MR. GOLDENBERG: I don't believe it is, sir.

BY MR. GOLDENBERG:

Q Could you answer the question?

A Yes, I could.

Yes, I would conclude to what degree the questioner seemed to have an acquaintance with computers, with programming, with circuitry, or with displays themselves.

Q Were there any questioners that you concluded had some degree of acquaintance with

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such devices because of the questions you were
receiving from them?

MR. ANDERSON: I object to the question. It's leading, speculative, hearsay, and ambiguous.

MR. GOLDENBERG: Is that all?

MR. ANDERSON: No. I could probably think of some more.

MR. GOLDENBERG: Should we take the time?

THE WITNESS: Should I answer?

MR. GOLDENBERG: Yes, sir.

(The reporter reads the pending question.)

A Yes, there were, indeed, people that seemed quite familiar with the computer techniques.

Q Is this true of both the weekend open house and the invited visitors' portion of the celebration?

A I cannot differentiate at this point.

Q If I had asked you this before, sir, I apologize.

Were there any restrictions put on as to whom you could give your tickets?

A No.

Q Are you aware of any restrictions put on any of the employees of the laboratory as to where they could give their tickets or as to whom they could give their tickets?

A I don't believe there were.

Q Do you know whether or not any of the visitors to either of the open houses were cautioned that they were not to discuss with anybody what they had seen at any demonstration?

MR. ANDERSON: I object. You're leading the witness.

MR. GOLDENBERG: I don't think I am, sir.

A There were no restrictions mentioned that I know of.

Q Any restrictions in connection with the particular demonstration for which you were responsible?

A No.

Q Do you know of any statements to any of the visitors that what they were seeing was in some way confidential or proprietary to RCA?

MR. ANDERSON: Same objection.

A No, it was not indicated as such.

Q Could you describe the apparatus used in conjunction with the pool game demonstration?

A Yes. It included the display terminal made by Information Displays, Incorporated; the light pen, which was part of their hardware; a rack of electronics,

also part of their hardware system, that included the ability to direct the display to draw lines, characters, circles and so on; and it included a small computer made by RCA, a Spectra 70/25; and then various computer peripheral equipment for storing programs and preparing and developing computer programs.

Q The IDI display device, the light pen, and rack of electronics, were those items purchased by RCA?

A Yes, they were.

Q Is that the display device that you testified about earlier?

A Yes.

Q I believe you testified that in 1966, or 1967 -- you weren't clear on that -- that on behalf of RCA you purchased an IDI display device?

A Correct.

Q That's the same device?

A Yes, it is.

Q Was that device bought for the purpose of this demonstration?

A No, it was not.

Q Without revealing information that you consider confidential to RCA, could you state generally what the purpose was in buying that device?

A The initial purpose was to explore general capabilities for a human to interact with a computer through a graphic medium, and to that end we wanted both an output display tube and some input device for indicating objects or positions on the screen to the computer.

Q The RCA Spectra 70/25 computer, was that a computer offered for sale by RCA as a commercial product at that time?

A Yes, it was.

Q Was that acquired for the purpose of the demonstration?

A No, it was not.

Q For what purpose was it acquired?

A As part of this system, indeed, to explore the uses of graphics.

Q You made reference to various computer peripherals. Were any of those RCA products?

A Yes.

Q Were all of them RCA products?

A They were all part of the RCA computer

product line.

Q Were those acquired for the purposes of this demonstration?

A No.

Q For what purpose were they--

A The entire equipment complement was purchased for investigations of graphics.

Q Was anything particularly purchased or acquired for the purposes of the demonstration?

A No.

Q Could you explain how the components-- if I can call them that--were assembled and cooperated with each other to permit the pool game to be played on the display device?

A I'm hesitating because we did not do any unique work in interconnecting any of this equipment specifically for the pool game.

I could describe how the equipment was indeed put together.

Q If you could do that, sir, and then--

Well then, would it be correct that in connection with the pool game it was used in the same manner which it was ordinarily connected for your other purposes?

A Correct.

Q Could you explain how it was put together?

A Yes. The computer and the normal computer peripherals that we had bought are interconnected in a standard manner as was made commercially available at the time. The information displays equipment similarly was a complete package of group of circuitry. The display and the light pen was one complete package.

Now, the interface between the computer and the display was designed specifically for that display and for the computer by one of the people at RCA, Mort Lewin. That consisted of what's called a direct memory access channel, which allows the display to access words from computer memory, each of those words being an instruction to the display for displaying a given line, circle, or character.

Q How would information about where that line, circle or character--

I'm sorry. Let me rephrase that.

Did the computer also supply information about the location on the screen of the display where the line, circle, or character was to be shown?

A Yes. If--

I could describe the way in which the computer would normally operate with the display, if that's what you would like.

Q If you would do that, sir. I apologize for my clumsy questions.

A A certain--well, an area of the computer memory could be used for a list of the instructions for the display. The display would request the next word from the computer. This would normally access the sequentially next word from memory. That word, the stream of bits within that word, would be interpreted by the display hardware. A group of those bits were allocated to specifying X and Y position on the screen. Certain other bits were used to define whether the item to be displayed should be line, circle, or character. Other bits would be used to indicate the structure of the item to be displayed, namely dotted, dashed, line width, intensity. After displaying this graphic entity on the screen, the display would then request from the computer the next display word. And one option for the word that was then accessed by the display would be as a jump or conditional jump instruction, which would essentially then request

the word from a different location in computer memory. And in fact, then the display would sequence through the list of instructions, display the picture on the screen, and at the end of the display would be instructed to jump back to the start of what we call the display file, the section of memory, and repeat displaying the information again. This is what is known as a refresh cycle.

Q Could you describe the pool game as seen on the screen of the display tube and as played by a participant?

A Yes. The display file would consist of 16 -- no, 15 instructions for the 15 balls, corresponding display instructions for the numbers corresponding to each ball that were to be displayed within the boundary of each circle, and a group of instructions for displaying the outline of the pool table and the pockets of the pool table.

The cue ball was displayed on the screen as a group of 32 dots arranged in a circular pattern.

The display would cycle through this group of computer memory words displaying the picture on the screen and repeat this until some action was taken with a light pen. The light pen could be used to point to any item on the screen and the computer would be interrupted when light was detected by this pen in one of two ways. One particular bit in this interrupt would be used whenever the light pen detected the light on all of the objects on the screen other than the cue ball; and a second bit of information was used for specifically separating a light detection on the cue ball from light detection of a different

entity. As this interrupt was received by the computer, the computer program for the pool game would interpret that interrupt and essentially ignore the fact of light being detected if the detection was on a non-cue ball item.

If the light detected was from the cue ball, the computer program would interpret the "hit", on the cue ball by determining which dot around the periphery of the cue ball had been hit and begin an action.

In this case, it would give the cue ball a velocity in a particular direction as determined by the individual dot.

Should I just go on with the description?

Q Yes, sir, if you could.

A The cue ball would then move in a direction as determined by this initial hit until it hit another object.

Now, hit another object, I mean intersected with the boundaries of another ball or of the wall, and this intersection was determined by the computer program by continually cycling through the 16 balls and the walls of the table looking to see if the boundary of any of the balls coincided with boundaries of other balls. In which case it would determine

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that an actual contact had been made and at that point the computer would go through a calculation to determine the new directions of the balls and the new velocity of whichever balls were hit; those calculations being done based on conserving energy, based on the principles of conservation of energy and conservation of momentum.

If the hit was on a boundary of the table, the calculations, in essence, the angle of incidents equalled the angle of reflection that the ball would bounce off of the wall.

The computer was also checking to see if the ball or any of the balls came into the region of the table that we were defining as the pocket of the table; and if a ball, if a ball did come into the region of a pocket, it would determine that a ball was sunk, it would blank the ball from appearing on the screen and would take the score as determined by the number of that pool ball and add it to one of the two player's scores.

When the friction on the table, essentially, a simulated friction, eventually slowed the balls down so that they came to a stop, the next player's turn using the light pen would start.

Now, this sequence would continue until either

all of the balls were sunk in pockets, or in our case, we defined that if the cue ball were scratched in a pocket, that the game would normally end at that point.

Q You made reference to something about a score. Was the score displayed?

A Yes, it was.

Q And did I understand you that the pool balls were numbered?

A Yes, they were.

Q Were those numbers displayed?

A Yes.

Q Physically what did that look like on the screen of the tube?

A It looked like a circle on the screen; each ball looked like a circle on the screen probably slightly larger than a quarter of an inch, and a number from 1 to 15 within the boundary of that circle.

Q Where did the information with respect to those numbers, where did that come from?

A That was also stored in this list of display instructions in the computer memory. As the particular characters representing that number of the ball and the XY location being maintained as the same of the center of the ball.

Q Assuming in the beginning of the game and within the four boundaries of the pool table, what did the observer see?

A At the start of the game?

Q At the start of the game.

A The observer would see the 15 balls racked up in a standard pool triangular configuration near one end of the table. The cue ball positioned down at the other end of the simulated table.

Q Was that accomplished by the program in some fashion?

A Yes. The computer at the start, the indication that a new number was desired would put the balls back in the standard position and await a light pen hit on the cue ball.

Q As play commenced were 15 balls on the table? Was there any difference between what an observer would see watching that display and what he might see watching a real pool game?

A Yes. We were attempting to simulate the pool game and I think in that sense came fairly close, but there were distinct differences from what would happen in a real pool environment.

Q Could you state those differences?

A There was no spin on the balls, so any effect one would obtain through spin, either spin through sideways or topspin on the ball was ignored. And, in fact, the motion of the balls was not completely

uniform, but was to a small extent a function of how many calculations of intersections of balls the computer had to perform at any given time. So that the motion was slightly ununiform.

Q Would you explain what you mean by ununiform? Different balls move at different speeds?

A The speeds of a ball could be noticed to be-- the speed of a ball would be somewhat slower where there were many intersections occurring, for example, during a break, then there would be if balls were scattered fairly broadly around the table. So it would be fairly faster with fewer balls on the table.

Q Was it to any degree faster as some of the balls left the table as the result of entering a pocket area?

A Yes. The same sense because of fewer calculations and our compensation for those calculations not being perfect.

Q If you decided to display a lesser number of balls than 15, would those differences between the game you were trying to simulate and the real game have been there?

MR. ANDERSON: I object to the question as asking for his present speculation of what

he might have done.

MR. TRIPOLI: You are not required to speculate.

Q I am not asking you to speculate, sir. I am asking on the basis of your knowledge at that time.

A The motion of the balls was more realistic with fewer balls on the table.

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Q Did I ask you where the information about the numbers on the balls came from?

A Yes, you did.

Q I did ask you, I believe, about the storing information being displayed on the screen of the tube also?

A Yes, you did.

Q Did you consider it a successful demonstration?

MR. ANDERSON: I object to the question as speculative.

MR. GOLDENBERG: No, sir.

MR. ANDERSON: And ambiguous. The definition of successful is certainly an unknown quantity and there is a lacking of any foundation here for what one would constitute success.

MR. GOLDENBERG: Let's have the witness answer the question and then we will find out what he means by success.

MR. TRIPOLI: Do you understand the question?

Q And this is in 1967 at the time of the demonstration, sir.

A Yes.

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The demonstration was successful in my mind in terms of getting across to people the concepts we wanted of absorbing and using information graphically and the enthusiasm generated by the people using the system was very large.

So, in terms of the excitement that people seemed to feel, it was certainly successful.

Q Did it perform, as you intended it to perform?

A We had intended the simulation to be somewhat better than it was, but it performed what we considered to be adequately.

Q In what respect did it not perform as you intended it to perform?

A Due to the time constraints, we did not have time to compensate for the effect of many balls versus fewer balls on the table. So that visual effect that I described before was one indication where we would have liked it to have been a little bit more realistic.

Q Did you have any view in 1967 that if you had been provided with additional time, that that defect could have been eliminated?

MR. ANDERSON: I object to the question.

It is asking for speculation.

MR. GOLDENBERG: I am not asking for speculation at all. I am asking you as of 1967 and to what extent he recalls it now.

THE WITNESS: We knew that we could have compensated for some of the motion effect better than we did. We did not feel that the use in the demonstration warranted it.

Q Do you have any recollection of a motion picture film being made of the pool game demonstration?

A Yes, I do.

Q Could you state what that recollection is, sir?

A There were two, at least two films that I recall that were made of the system. One was by the BBC. That was made subsequent to the open house demonstration, but of the demonstration as we showed it.

Q You did mention another film. Could you give me your recollection of the other film?

A Yes. I believe there was also a film made before the open house demonstration by Earl Ewbell of CBS for airing on CBS in New York, possibly the network.

Q Did you ever see this CBS film?

A No, I didn't.

Q Have you ever seen the BBC film?

A Yes, I have.

Q When did you first see it, sir?

A I received it when a copy of the film was sent to us from them.

Q Do you recall approximately when the BBC film was made?

A Only that it was a number of months after the open house, but I don't recall when.

Q Could it have been in 1968?

A It could have been early '68.

Q With respect to the BBC film, was that made at the place where the demonstration actually occurred?

A Yes, it was.

Q The same physical location in the RCA Laboratories?

A Yes. The equipment was very difficult to move.

Q How long after the film was made did you receive a copy of the BBC film?

A I don't recall, it was within half a year of the time of the filming, but I don't recall when.

Q Was the film sent to you?

A I think it was actually sent to the public

relations department in RCA Labs.

Q How did you find out about the receipt of the film?

A I was informed by them of its existence and eventually given the film by them.

Q Oh, they physically gave it to you?

A Yes.

Q When did they do that?

A As I say, shortly, maybe within a few months of the time of the filming.

Q Where has the film been in that interim period until now?

A On top of my filing cabinet.

Q In your office?

A Yes.

Q Do you know where the film is today?

A I believe I do. I believe it is being duplicated today.

Q When was the most recent time you saw the film?

A When I viewed it with you last -- well, a few days ago.

Q Was anybody else present at this viewing when you saw it with me a few days ago?

A Yes.

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Q He points to Mr. Williams.

A And several people from RCA.

Q Were there any changes or alterations in the film from the time you saw it a few days ago and the time it first came into your custody?

A No, there were not.

Q With reference to your memory of the film as you saw it a few days ago and your memory of the demonstration pool game, do you believe it to be an accurate depiction of the pool game as played in 1967?

A Yes, it was.

Q Is there anything in the film which was not part of the 1967 demonstration?

A No, there wasn't--yes, there was.

Q Could you tell us what?

A There was a scene at the start of the film of a real pool table and Larry French and myself playing pool on it. But that was used for illustrative purposes of what a real pool game is like and was not part of the demonstration.

MR. GOLDENBERG: Mr. Anderson, I'd like to reserve RCA deposition No. 9 for the print of the film.

Are we going to have any difficulty, Mr. Anderson, because of the mechanical problem with the film, duplicate not being

here today, about identification and such as that?

MR. ANDERSON: No, I don't think that because of that mechanical problem we will have any difficulty.

MR. GOLDENBERG: We may have other problems, but we are not going to have that one?

MR. ANDERSON: That's right.

[Exhibit No. RCA-9 reserved for BBC film duplicate.]

Q Do you recall any still photographs being taken of the pool game demonstration?

A Yes, there were. There were pictures taken before the demonstration, before the open house for purposes of preparing a booklet on the various demonstrations.

Q Was such a booklet ever prepared?

A Yes, it was.

Q Do you know where a copy of that booklet might be?

A I know where a number of copies are.

MR. GOLDENBERG: Off the record.

[Discussion off the record.]

MR. GOLDENBERG: While we were off the

record there was colloquy about the booklet that Mr. Teger testified about, and I believe that counsel for the various parties here were able to identify what booklet he had in mind. Neither side in this matter requested a copy of that booklet at last Friday's presentation. It was understood, however, that it would be available today and we are advised by Mr. Tripoli that he will have it available tomorrow morning.

Q Do you have a recollection that in that booklet that there was a photograph of this pool game demonstration?

A Yes, there is.

MR. GOLDENBERG: I would like the Reporter to mark as RCA deposition Exhibit 10 a copy of a photograph.

[RCA Exhibit No. 10 - copy of a photograph - marked for identification.]

Q Mr. Teger, I show you RCA Exhibit 10 and ask you if you have ever seen this before?

A Yes, I have.

Q Could you state the circumstances under which you first saw that photograph?

A This is one of the pictures that was taken at

the time of the open house.

Q Do you know who took that picture?

A Yes. The staff photographer at RCA Laboratories, Tom Cook.

Q Can you identify the persons in the photograph?

A I can identify--no, I cannot identify either of the parties.

Q Can you identify the apparatus shown in the photograph?

A Yes, I can.

Q Could you describe that apparatus and identify it as you do?

A Yes. This is part of the equipment that we have been describing. This is the IDI display console and the light pen with the pool table displayed and the pool table game apparently in progress.

Q Are there any balls displayed on the pool table?

A Yes, there are.

Q Is the cue ball displayed on the pool table, can you tell?

A Yes, I believe it is.

Q Can you tell from Exhibit 10 whether or

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not the portion--from the portion of the room shown in the photograph, whether that is the room where the demonstration took place in September of 1967?

A Yes, I believe it is.

MR. GOLDENBERG: I would like to mark as RCA Deposition Exhibit 11 the 24 page document entitled "Computer-In-The-Home Study," by L. J. French and A. H. Teger, dated April, 1967.

(Document entitled "Computer-In-The-Home Study, dated April, 1967 received and marked RCA Deposition Exhibit 11 for identification.)

BY MR. GOLDENBERG:

Q Mr. Teger, I show you Exhibit 11 and I ask you if you can identify it?

A Yes, I can.

Q Could you state what it is, sir?

A It is a report that was prepared by Larry French and myself to discuss some of the potential applications of graphic systems.

Q I apologize for having you repeat this, but could you state again what you mean by graphic systems?

A Systems utilizing a display and some intelligent control of the display, generally through computer means and some input device for interacting with the display.

Q What was the purpose of preparing this exhibit 11?

MR. ANDERSON: I object to the question.

You say what was this witness's purpose, or the purpose of RCA, or some combination? It's vaguely ambiguous. It lacks a foundation.

MR. GOLDENBERG: I don't think it is.

I think the witness understands.

BY MR. GOLDENBERG:

Q What was your purpose in preparing this exhibit 11 along with Mr. French?

A It was to explore a line of research that RCA might undertake that might result in products related to use in systems containing displays and computers in the home.

Q Were you requested to undertake the preparation of Exhibit 11?

A Yes, I was.

Q By whom?

A By my supervisor, who at that time was Mort Lewin.

Q Did he tell you why he wanted you to do this?

A Yes. We were attempting to make some decisions about which particular applications to explore in more depth on this system that we had purchased so that the general research intergraphics and

human interaction could be directed to an eventual product area.

Q Sir, I know it's 22 pages or so long. I would ask you to turn through it and tell us whether or not it reflects your thinking at the time it was prepared as to what the possibilities were.

MR. ANDERSON: You mean accurately reflects his point of view and thinking?

MR. GOLDENBERG: At that time.

A Yes, it does reflect my thinking for the way things stood at that time.

Q Directing your attention to page 2, what is a button box?

A A button box is a box containing any number of buttons where the buttons are assigned functional meaning, as opposed to a typewriter, where one might think of a key as a button, but there the key reflects simply a character of the input.

So, in effect, pressing a button in this sense on a button box would indicate to the system you would like to perform some action or group of actions.

Q Was it a way of getting an input to the system to command it to do something that you wanted it to do?

A Yes.

Q Directing your attention to the second page, not page numbered 2, actually the second page of the document, "Areas to be considered," and the item Roman numeral I is "Home Entertainment Applications."

Could you state what you meant by that at the time you prepared this document in conjunction with Mr. French?

A Yes. I meant groups of games or general entertainment functions that could be performed on a display or actually, as explored here, on some systems possibly without a display, but ones that could be part of a home environment.

Q Directing your attention to Page 6, does that page accurately reflect your understandings at the time you prepared this document in April of 1967?

MR. ANDERSON: You're referring to the entire page?

MR. GOLDENBERG: Yes, sir.

A I don't understand what you mean by--

Q Well, is that an accurate recordation of your thoughts with respect to this subject matter, what you call a System, Roman numeral II, at that time?

A It's an accurate reflection of my thinking at that time, but obviously rather condensed.

Q I notice there is an entry there toward the bottom under "Costs," under the "D. Selling price of two button boxes." Would it be a correct understanding that what you were proposing there would require two button boxes, as you have described them earlier?

A What we were proposing for some of the applications to be covered by this system, we had felt that for some applications it would be most convenient to have two separate boxes that could be held by each player and commands input from each

player through these boxes.

MR. GOLDENBERG: We would like to talk privately for a moment.

[A short recess was taken.]

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THE WITNESS: I had wanted to check something, if possible, on the first take, on the degree situation, which I am not sure I stated accurately.

MR. GOLDENBERG: The degree situation?

MR. TRIPOLI: You mean on the technical degrees?

THE WITNESS: Yes. I have done master's work at the University of Pennsylvania, but I did not receive a degree. I completed the work in '65.

DIRECT EXAMINATION [CONTINUED]

BY MR. GOLDENBERG:

Q Sir, I show you a document and I ask if it refreshes your recollection to any degree as to when the BBC film was made?

MR. GOLDENBERG: Mr. Anderson, here is the document I am going to show the witness.

MR. ANDERSON: Why do you want me to look at this document?

[Off the record.]

MR. ANDERSON: I will say that is a hearsay document as far as this witness is concerned. I object to any testimony about it.

MR. GOLDENBERG: I am not eliciting any testimony about the content of the document. I am simply showing it to him to see if it refreshes his recollection.

A Yes, this agrees with my estimates of when the filming would have taken place.

Q I would ask you, sir, without telling me what the document says, does it refresh your recollection to any degree about when the BBC film was made?

A Yes, it does.

Q On the basis of having your recollection refreshed as a result of looking at that document, can you fix that date more accurately than perhaps you did earlier in your testimony?

MR. ANDERSON: I object. You mean from his present now recollection, which would be different from his recollection before you showed it to him? Or do you mean could he read the document? Because I can read the

document.

MR. GOLDENBERG: I understand you can, sir. My question was, has his recollection been refreshed as a result of reading the document.

MR. ANDERSON: His independent recollection versus after reading the document?

MR. GOLDENBERG: I thought he said yes.

MR. ANDERSON: I thought he said he agrees with his prior testimony.

MR. GOLDENBERG: I don't think you were listening to the restatement of the question and his answer.

Would you like the Reporter to read it back?

MR. ANDERSON: It's not necessary for me, unless you would like it.

MR. GOLDENBERG: No. I'm perfectly happy with the way it stands.

BY MR. GOLDENBERG:

Q Sir--

A My recollection is indeed that the filming took place sometime in early 1968. Beyond that it does not refresh anything.

MR. GOLDENBERG: Thank you, sir.

That completes our direct examination.

MR. TRIPOLI: Before we get started on cross-examination, I would indicate that Mr. Teger's normal quitting time is around 5 o'clock at the Laboratories, and according to my watch it is 24 minutes before 5 at this point in time. I am certain that Mr. Teger would be willing to stay here until 5 o'clock, and he has indicated to me that he would be available tomorrow morning to continue.

Now, if counsel would care to make any arrangements you care to.

(Off the record.)

CROSS-EXAMINATION
BY MR. ANDERSON:

Q Mr. Teger, in RCA Exhibit 10, which you identified, it appears that the display that's visible in that photograph shows these arcuate corners on the rectangle, which are rather ragged looking.

Were they, in fact, ragged looking, or were they smooth and shaped like a pocket on a billiards table?

A They were, in fact, ragged looking. They were a sequence of lines.

Q A sequence of straight lines?

A Yes, simulating a curved pocket.

Q Was the system unable to draw a curved pocket like you were trying to simulate there?

A The system did not have a command to draw an arc of a circle.

Q Did I understand you to say that Exhibit 10 is the photograph that was concluded in the book that was prepared for the open house?

A No, it was not.

Q It's a different photograph than that one?

A Yes. Taken at the same time, though. The other is very similar.

Q Now, you have testified, I believe, that you participated in the work which resulted in RCA Exhibit 11, entitled "Computer-In-The-Home Study;" is that correct?

A That's correct.

Q Did you prepare this actual document with Exhibit 11?

A Yes. I participated in the preparation of it.

Q Who else participated other than you?

A Larry French.

Q Anyone else?

A No.

Q I think you said this report was prepared as a part of an exploration that you were instructed to undertake by Mr. Mort Lewin.

A Correct.

Q When did he instruct you to undertake that investigation?

A Approximately March to April of 1967.

Q Did anyone other than you and Mr. French participate in that investigation?

A We were the principal investigators. There may have been some technical discussions with other people at the time, but they were not directly involved in the complete investigation.

Q Roughly, how many man days of effort led up to the preparation of the report, RCA Exhibit 11?

A Approximately 120 man days.

Q I think you testified on direct that the purpose in the investigation which resulted in Exhibit 11 was to explore a line of research which might result in products which RCA might manufacture; is that correct?

A Correct.

Q Did any RCA products result directly from the study that's reported in Exhibit 11?

A No, there was no direct result of that study.

Q When you prepared Exhibit 11, did that complete the exploration project that Mr. Mort Lewin had instructed you to conduct?

A Yes, in this area.

Q And when you say "in this area," you mean with respect to "Computers-In-The-Home Study"?

A Yes.

Q There was no further follow-up study of "Computer-In-The-Home" following this one that followed directly from it?

A There was no further formal study that followed it, but there were discussions on whether we should proceed with research in this area or not.

Q And was research pursued as a result of this study reported in Exhibit 11?

A Not on this system that I have described.

Q Describe in Exhibit 11, you mean?

A Correct -- no. We did not pursue any research in this area on the hardware described, the IDS display and the 70/25 computer.

Q Is there any direct relationship between the IDS display and Spectra 70 computer that you had in Location 39 at the open house and the study which

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resulted in Exhibit 11?

A Yes.

Q What is that result of relationship?

A The study was made before the demonstration, the open house demonstration, and actually the pool game was an illustration of one of the approaches and one of the games that could be taken with that approach as described in the study.

Q Then the inception of work on the pool demonstration on the IDI display actually initiated before June, but has its genesis at least in March or April of 1967?

A Without any definite--yes, but not in the sense of any definite decision being made or even proposed to implement a particular game such as pool on the system. But these ideas were being discussed before that time. They were not--in this study they were not being discussed in terms of the open house demonstration.

Q Now, if I understood your direct testimony, you estimated that you spent at least 60 man-days and, perhaps, one of your co-workers spent at least 60 man-days doing the work which resulted in the IDI demonstration at the open house?

A Correct.

Q And then there were other people that worked on it to where you can't pin down the amount

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of time, is that right?

A Correct.

Q Am I correct that all of that effort was in writing programs in contrast to doing any hardware development?

A Yes.

Q There was absolutely no development of hardware or equipment in preparing for the demonstration at the open house, is that correct?

A Yes.

Q Was there any work on hardware or equipment or devices at all involved in the study project that is reported in Exhibit 11?

A I'm sorry, repeat that.

[The pending question read back by the Reporter.]

THE WITNESS: No, there was not.

Q In Exhibit 11 at the Page numbered 2, there is reference to cost under the Number 6 and under that (a) hardware development. What kind of hardware development were you referring to there, if you recall? What were you thinking at that time?

A We were thinking in terms of what hardware specifically would be needed for a system for the applications which we were then going to look at in

the study. An example of that would be a hardware interrupt type of circuit.

Q How would a hardware interrupt circuit enter into the equipment that you were thinking of for this study?

A There is some question of how much of the trade-off in identifying an object should be done by a computer program and how much of that identification can be performed by hardware in terms of the location of an object and the particular object that is identified at the moment. That's only an example of the kind of things that we felt should be considered for each approach.

Q And the hardware you were thinking of did not exist at the time you prepared the report in April of 1967, is that correct?

A We did not own any hardware for--I don't understand the question.

Q Well, you note on Page 2 of Exhibit 11, after the cost and under that, A, hardware development (innovations required).

Now, did that mean that hardware had to be created? Is that what you meant by "innovations required"?

A We meant that in studying the applications

in this report we wanted to look to see if any innovations were required for any given approach or any given application. And to estimate the amount of work, perhaps, required to accomplish it.

Q The amount of work to accomplish the development of that new hardware?

A Yes.

Q Did you carry the study to that extent that you did actual projections of what hardware would be needed and how much it would cost to develop it?

A We did only a relatively short investigation of whether any particular hardware would be required for an application which was not readily available. This whole study only represented a two-month study by the two people. It was not in depth.

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Q Mr. Goldenberg asked you several questions about page 6 of the report, RCA Exhibit 11, and I notice on page 6 under the notations 7 times schedule, it says, (a) hardware, five to ten years.

Is that referenced to the hardware that you are referring to at page 2 where it says (a) hardware development (innovations required)?

A Yes. It is referring in particular to some of the hardware areas described in page 5, Item 6A.

Q Then it is correct then that those items listed on page 5 under 6A were products that would have to be developed under this study program or as a consequence of this study program to produce the products that are suggested in it, is that correct?

A Yes.

Q Under paragraph 3 at page 6 you make reference to dynamic applications such as pool, baseball, et cetera, must be done by a local computer to achieve the proper visual effect. What is the reference to a local computer there?

A That was to differentiate it from another approach described in here which had a display linked to a remote computer in a time-sharing fashion.

Q Now, I think you testified that in the demonstration at the open house the display was not

in any sense real time, but was a time variable display, is that correct? In other words, the ball sped up and slowed down in the course of moving about?

A That's a bit of an exaggeration -- yes, they did speed up and slow down somewhat, but its effect is not a large one.

Q But I think you said it was visible and a dissatisfaction that you had with the demonstration at the time of the open house?

A Yes.

Q Did you proceed with your work on the Spectra 70/25 and the IDI display to eliminate that disadvantage or dissatisfaction with the demonstration?

A No.

Q After the open house then you abandoned that work and went to other projects, is that correct?

A We did not do any further work on the pool game.

Q Do you know the approximate list price of the Spectra 70/25 at RCA?

A At that time?

Q In 1967.

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A I don't know the exact figure, but I believe it was in the order of \$90,000.

Q 90,000. Approximately how much did the IDI display and the associated IDI racks cost?

A Approximately \$50,000.

Q Were the racks and the display purchased separately or were they a package?

A The IDI electronics display and light pen were all one package, although that was somewhat tailored to our specifications.

Q Do you know what just the display alone, apart from the electronics to generate lines and circles cost RCA?

A No, it was a single purchase. No, I don't know.

Q But as I understand it, it is the racks of equipment that sat alongside of the display that were essential to drawing the lines and circles that you used to create your pool demonstration, is that correct?

A One rack was the IDI electronics, the other racks and equipment were for the RCA computer.

Q And that rack of IDI equipment was essential to making lines and circles on the IDI display; am I correct?

A That provided the mechanism that we used for

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it. I am not sure of the use of the word essential.

Q If those had been disconnected, you would not have been able to run your program on the IDI display, am I correct?

A It cannot have been written the way we wrote it?

Q Right. It would have had to write a different program at least?

A Yes.

Q That is what I meant by my question.

I would like to have you look at a document which I will have the reporter mark as RCA Exhibit 12 and ask you if you can state what it is.

(Exhibit RCA-12 received and marked for identification.)

Q Can you identify what is shown in that photograph which comes from RCA records?

A Yes, I can.

Q What is it, please?

A That's a photograph of the IDI display and some of the -- the computer and some of the peripherals associated with the computer.

Q Now, is the IDI display the equipment that the man is sitting and facing?

A Yes, it is.

Q And is the IDI rack that you testified about shown in that photograph?

A No, it is not.

Q Exhibit 12.

Is it a rack that looks like anything that is shown in the picture in size and shape?

A Yes. It is the size and shape of the first rectangular piece of equipment to the left of the display, the large one.

Q And there are two such racks shown in their entirety in the photograph and parts of three more, is that correct?

I guess that is not quite accurate.

A I see three full ones shown and parts of two.

Q Yes, I agree.

And each one of those is what you referred to as a rack; is that correct?

A Correct.

Q And so there are five, at least partially shown in the photograph.

Were all of those a part of the IDI -- excuse me, a part of the Spectra 70/25 that was

employed for the demonstration?

A Yes.

Q Were there more racks like that associated with the Spectra 70/25 used for the demonstration?

A Yes.

Q How many more?

A Approximately two more.

Q And in addition to that, there was one for the IDI display?

A Yes.

Q So that there were approximately eight racks such as the five partially shown in the photograph, Exhibit 12?

A Correct.

Q What was the refresh cycle of the IDI display, if you recall?

A I am not sure what you mean by that.

Q What was the period between refreshes? Was it a variable or was it a constant.

Q It was a variable.

Q Did it vary with the amount of data being processed or with respect to some other parameter?

A The length of time to repeat a given frame on the screen was fixed at, I believe, a 30th of a second until the amount of information that it was

attempting to write on the screen exceeded that and at which point it would take as long as necessary to put the information on the screen.

Q And in all refreshes, were all things being refreshed or just certain ones?

A All things.

Q And was that done by first refreshing the rectangular representation of the table and then certain balls, and then after that, certain numbers? Was that the general way it was done?

A I am not sure what you mean.

Q Well, am I correct that the display was refreshed by first refreshing some portion of the total picture, whether it was one of the balls or the rectangular or something?

A Right.

Q In a refresh operation, what was the first thing that was refreshed, if you recall?

A I believe the table was refreshed first and then it would refresh each ball and the number inside of the ball.

Q The ball and then the number and then the next ball and then the number?

A Right.

Q And this was true no matter where in the field those balls were located?

A That's correct.

Q When the maximum load of data processing was on the system, perhaps at the break of the display, what was the ratio of the time for refresh to the time when it was running at its fastest refresh rate?

A The pool game was an application with fairly low demand on the display in terms of refresh rate, and the display was simply refreshing the entire screen with the balls and the table once every 30th of a second.

Q But it ran at a slower rate when the computer became burdened with a lot of activity; as I understand it?

A The display did not run at a slower rate. The display continued to access at the same refresh rate of a 30th of a second per frame.

What did slow down was because of the calculations within the computer, the balls didn't have the appearance of moving as quickly because the computer was attempting to do many calculations on each ball. But the screen did not change in its refresh rate.

Q I think I understand. In other words, the refresh rate was uniform but the time represented by activity during the refresh cycle would expand or contract depending on the burden on the computer?

A That is approximately right.

Q Do you recall what the resolution was of the IDI display?

A Yes. It was capable of delineating 1 out of 1,024 in X and in Y. Another 1,024 in Y.

Q When the IDI display was programmed to generate only dots, in other words, you were not using it to generate circles or lines at a given time, but only dots, how many dots was the IDI display capable of displaying in one refresh cycle, do you recall?

In other words, what was the time necessary for the -- you seem troubled.

A Again, we get into the question of variable refresh, so I am not sure what you are asking.

Q What is the time required for the IDI display in 1967 that you had between displaying one point and being given new information and new magnetic stability and display at the next point? What is the minimum time gap between that, if you

recall?

A I don't recall what the exact figure was, but for the pool game, that was no limitation at all. It would have meant much more complexity on the screen before we ran into a problem.

Q Do you know whether it was a hundred microseconds or more or less?

A I think it was faster than that. I think it was more like five to ten microseconds.

Q Did you personally work on any other demonstrations for the open house other than the demonstration of the IDI display and the Spectra 70 computer?

A No, I did not.

Q Where is Mr. Larkin now, do you know?

A I believe he is in Pennsylvania, but I am not exactly sure where or what company he is working for.

Q Mr. Teger, I place before you Exhibit 8 and in particular I'd like you to look at the second page.

I understand this is a documentation of time spent by people in the RCA Laboratories in preparing for the open house, especially in Sections 10 and 11, is that right?

A It is a representation only for the people within those sections.

Q What was Section 10? Did it have a title or a task assigned to it?

A Yes. Section -- it is complicated slightly by the fact that Section 11 was created during this time frame, approximately, and I am not exactly sure when. I don't recall the exact title of Section 10 at that time, but it was something on the order of computer research laboratory.

Q And what was the title or task of the new Section 11, as best you recall it?

A I don't remember the title. I think it was -- it had more to do with applied computer applications but I don't recall the exact title.

Q Do you know Mr. A.R. Sass? Who is listed at page 2 of Exhibit 8?

A I am familiar with the name but I don't believe I know him.

Q Was he at anytime involved in television engineering work at RCA, do you know?

A I am not sure.

Q Are you familiar with Mr. J. Avins, listed at the third page of Exhibit 8?

A Yes, I am.

Q What were his duties at RCA about that time in 1967?

A I have no idea.

MR. GOLDENBERG: I object.

Q Did he ever work on television engineering do you know?

MR. GOLDENBERG: I object to that question.

THE WITNESS: Can I answer it?

MR. ANDERSON: Yes.

MR. GOLDENBERG: Let me state the reason for my objection. I don't think it is relevant to the issues in this lawsuit, nor is it likely to lead to discovery of admissible evidence.

Q Would you answer the question, please?

A I know he did work on television research during his career, but I don't know when.

Q Are there any other individuals named in Exhibit 8, to the best of your present knowledge and information, who at anytime in their career at RCA did television engineering work?

MR. GOLDENBERG: I object to that question for the reasons previously stated.

THE WITNESS: Prior to 1966-1967?

Q All right, answer it both ways, prior to and/or afterwards. Separately, of course.

MR. GOLDENBERG: Mr. Anderson, if you are trying some other lawsuit in this case, I wish you wouldn't, you are taking up our time.

MR. ANDERSON: Mr. Goldenberg, I assure you I am trying our lawsuit..

THE WITNESS: I would prefer not to comment on the names subsequent to those years.

MR. TRIPOLI: I believe that the subpoena presented by Magnavox speaks in terms of prior to January 14th, 1969 in all respects. So if you care to restrict your answer to prior to January 14, 1969, insofar as you know --

MR. ANDERSON: All right. Why don't you go ahead and do that first.

MR. TRIPOLI: Incidentally, my comment was not a statement as to whether or not the question should or should not be answered.

THE WITNESS: There are no names on the list that I am familiar with of people who were involved in television research prior to 1969.

Q Other than Mr. Avins whom you already

mentioned?

A Actually, I'm confused now over the question of Mr. Avins. There are two J. Avins in the laboratories, and looking at the name on this list, I suspect that might have been the one not involved in television research.

Q But you don't know?

A No, I don't know.

MR. ANDERSON: We have no further cross-examination.

MR. GOLDENBERG: One or two short questions.

REDIRECT EXAMINATION

BY MR. GOLDENBERG:

Q I would like to direct your attention back to Exhibit 11. Is it correct that the purpose of this document was an exploration of possibilities for computers in the home?

A Yes.

Q Now, directing your attention to the second page, not page numbered 2, and the items Roman numerals I through VI, would it be contemplated that a computer going to the home in whatever system configuration possibility is described here would be capable of one or more of those applications?

MR. ANDERSON: I object to the question. It's vaguely ambiguous. It's couched in improper terms of "Would it be."

MR. GOLDENBERG: I am trying to elicit the witness's explanation of the document.

Q Do you understand my question, sir?

MR. ANDERSON: Well, I would ask that you ask a proper question if you want to elicit facts.

Q Do you understand my question? If you don't I will restate it.

A No, I prefer you restate it.

Q Perhaps it could be best done in this fashion. If we turn to Page 6, and I understand that represents your thinking at that time about a system Roman numeral II?

A Yes.

Q Now, is that your thinking with respect to a System Roman numeral II in the home entertainment field? And to help you there, sir, I direct your attention to Page 4, where there is another reference to a system Roman Numeral II.

A The System II referred to on Page 6 is, indeed, the one--that, indeed, is the same one being referred to on Page 4.

Q So to be sure, therefore, a System II as you visualize it at that time would be capable in accordance with the statements you have made on Page 4; is that correct?

MR. ANDERSON: I object. You're leading the witness. You interrupted him first. He wasn't finished.

MR. GOLDENBERG: Mr. Anderson, if I interrupted the witness, I certainly apologize. It was not my intention.

BY MR. GOLDENBERG:

Q Did I interrupt you, sir?

A Yes.

Q I apologize. Could you complete your answer.

A The system described on Page 6 is the same one that was referred to on Page 4. That system was exploring the potential for using that system for the entertainment functions, which includes those described on Page 4. But that system configuration could be used for other application areas other than entertainment, as well.

Q That is now my question, sir: Did you contemplate a use of the System Roman numeral II for the home education, any of the home education applications?

A Yes.

Q How about the home finance applications?

A Yes. In fact, we considered each of the six hardware systems in the context of each area of interest, those areas to be considered which are on the second page.

Q Would you bear with me for a moment.

I direct your attention to Page 15.

A Yes.

Q And there is another reference to a System II. And Page 15 follows Page 14, which refers to home education series.

What was the purpose of referencing the System II configuration under the home education applications?

A It was to look at the appropriateness and expense of developing a system for--developing, for example, System II, which included system and display in the home education area.

Q Would that same System II once developed have use in the home education area and also in the home entertainment area? Was that the concept that was being laid out in this document?

A The concept was that it could have application in one or more of those areas.

Q And is there within the document a conclusion with respect to the System II applications in both home entertainment and home education?

A I believe so.

Q And I direct your attention to Page 15 and to Page 6--I'm sorry, Page 4. With your

attention directed to the pages, is it your testimony that the conclusion of this document was that the System II would find application both in home entertainment and home education?

MR. ANDERSON: I object. You're leading the witness, not only by pointing him to the pages where you want him to read, but by phrasing his conclusion for him and asking him to agree with your statement of it.

MR. GOLDENBERG: No, sir, I am not.

Q If I am incorrect, please so state.

MR. GOLDENBERG: I point to the pages merely to utilize the witness's time best at the end of the day.

A The conclusion was that System II could have application in both the home entertainment and the home education areas.

Q Do you recall whether or not there were any conclusion about System II in any of the other areas: home finance, home miscellaneous, small business, or large data bank applications?

A I do not recall, to be honest. I don't think they were considered quite as strongly as the first two areas.

Q The RCA Spectra 70/25 computer, what kind

of computer was that, sir?

A It was a general purpose computer in the size range of what we today call the mini-computer.

Q Was it capable of performing functions other than playing pool games?

A Absolutely.

Q Were any of those other functions scientifically more sophisticated than playing games?

A Scientifically, yes. There were other applications more sophisticated.

Q Mathematically more complicated?

A Yes.

Q Did the playing of the pool games tax its resources?

MR. ANDERSON: Would you read the question, please.

[The Reporter reads the pending question.]

MR. ANDERSON: I object to the question. It's been asked and answered, I think.

A At times, yes.

Q In what respects?

A In terms of the number of simple, but repetitious calculations needed within a given time limit.

Q Is it correct that this is the thing

that resulted in the slowdown of the ball motion at certain times in the play of the game?

A Yes.

MR. GOLDENBERG: We have no further questions.

MR. ANDERSON: No recross. You're excused, Mr. Teger. Thank you very much.

MR. GOLDENBERG: Before Mr. Teger leaves, we would like to offer as exhibits 10 through 12, with the understanding that the film is not here.

MR. ANDERSON: We have no objection to the admissibility of 10 through 12. [RCA deposition Exhibit Numbers 10, 11, and 12 received and marked in evidence.]

MR. GOLDENBERG: Mr. Tripoli, can we have the same stipulation with respect to signature as far as Mr. Teger's deposition is concerned that we have with respect to Mr. Cooke's?

MR. TRIPOLI: Yes, you may.

MR. GOLDENBERG: That means that you will be provided with an opportunity to read the transcript of your deposition here. If you find any errors, call them to Mr. Tripoli's

attention. Don't mark on the face of the transcript. Keep a pad and note the page and line number, and he will discuss it with Mr. Anderson and me and attempt to get it rectified.

MR. ANDERSON: That will be fine.

THE WITNESS: All right.

[The witness is excused and the deposition is concluded.]

CERTIFICATION

WE, GUY J. RENZI and EDWIN SILVER,
Certified Shorthand Reporters of the State of New
Jersey, do hereby certify the foregoing to be a
true and accurate transcript of our original
stenographic notes taken at the time and place
hereinbefore set forth.

GUY J. RENZI, CSR

EDWIN SILVER, CSR

DATED: OCTOBER 27, 1976